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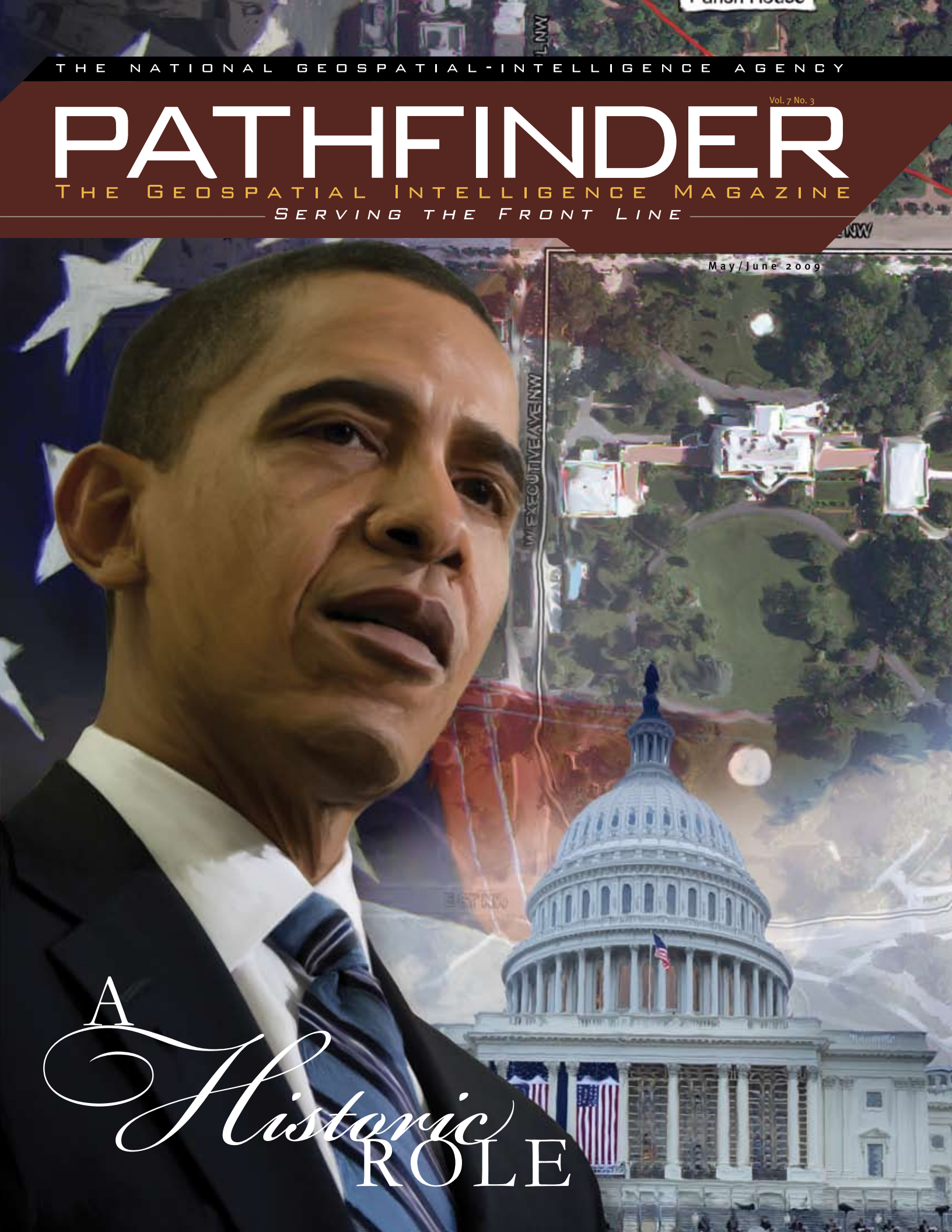

A *Historic* ROLE

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On My Mind

Keeping America Safe and Secure

Protecting American lives is our most important mission. Ensuring the security of the U.S. homeland requires collaboration among hundreds of local, state and federal agencies. NGA is proud to contribute to the vital homeland security mission. Geospatial intelligence (GEOINT) provides a critical perspective to security matters and provides a common operating picture that facilitates cooperation between stakeholder agencies, first responders and policy makers. Our support to the homeland security mission set has increased significantly.

GEOINT Adds Value

Our involvement will only continue to grow as we improve our capabilities and more partners understand the value that NGA adds. To complement our increasing role, NGA's Office of Global Support has brought another Domestic Mobile Integrated Geospatial-Intelligence System (DMIGS) into service. These self-contained vehicles represent "NGA on wheels" and can travel to any and all National Special Security Events to provide on-site analysis and secure communications between facilities. DMIGS also enables valuable real-time reach-back capabilities during natural disasters like flooding, hurricanes and forest fires, bringing analysis forward from headquarters to the field.

During the flooding in North Dakota and Minnesota in March and April, NGA provided critical GEOINT in support of FEMA and other federal, state and local organizations. NGA provided analysis that assisted in the planning and movement of resources to mitigate the impact to lives and property. NGA also supplied GEOINT from multiple imagery and geographic information system sources for all rivers in the area in order to identify critical infrastructure and affected population centers. This enabled analysts to monitor levees and gauge data for areas of potential impact.

Working Together

Successfully supporting the homeland security mission requires building and enhancing partnerships across the Intelligence Community, the Department of Defense and civil agencies. Following the dramatic ditching of a US Airways A320 into the Hudson River, NGA provided graphics and satellite imagery to the National Transportation Safety Board (NTSB) to assist in the after-action investigations. Working with NTSB demonstrates another example of partnership and collaboration. Our support enabled NTSB to meet its mission by helping with post-accident analysis and forensics, with implications for the improvement of airline safety. NGA can support these types of missions in a powerful way by providing a visual and spatial understanding. We are uniquely postured to positively impact the lives of Americans with our scientific understanding and current situational awareness of the Earth.

Protecting America

Respecting civil liberties is a foundation of our country, and NGA remains tirelessly committed to the highest protections for the rights of American citizens and unwavering respect for our laws. Stringent intelligence oversight regulations enable NGA to effectively perform its required functions while ensuring that the constitutional rights and the privacy of U.S. citizens are protected. The revisions to Executive Order 12333 maintain the privacy and civil liberty protections that are central to the way the NGA operates.

The homeland security mission set will continue to grow. With the recently renewed focus on border security and drug violence in Mexico, GEOINT will continue to bring a valuable perspective and inform first responders and policy makers. NGA will support the Department of Homeland Security in upcoming National Special Security Events and natural disasters whenever and wherever needed. We are committed to serving our nation and our people are dedicated to serving this and every other national security mission.

Robert B. Murrett
Vice Admiral, USN
Director

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On the Cover

The presidency of the United States commands the attention of the nation and the world. Protecting the continuity of the office and the safety of the officeholder represents both a crucial responsibility and a geospatial challenge. Many agency products and much agency support contributed to the successful inauguration of the nation's 44th president on Jan. 20, 2009, exemplifying the importance of collaborating effectively with NGA's domestic partners. The map book prepared by NGA for the presidential inauguration included the annotated graphics of Washington, D.C. that grace this issue's cover along with the photo of President Barack Obama provided by the Department of Defense. Cover design and photo illustration by Anika McMillon.

More to the Story?

The online Classified Pathfinder, which is accessible by members of the Intelligence Community, may include additional information and expanded sections of some Pathfinder articles. The Classified Pathfinder provides a forum for reading and discussing topics at the level of "Unclassified//For Official Use Only" or higher. For information please contact the Classified Pathfinder editor, Heather Cox, at 301-227-2290.

Letter to Our Readers

A Historic Role

No matter their politics or party affiliation, at each election the people of the United States celebrate the remarkable achievement of over two-and-a-quarter centuries of solid democracy and representative government. Every four years, citizens of all hues and stripes gather to welcome the newly elected president, joining in a show of unity as the nation collectively bids the chief executive well.

The faithful unrolling of America's constitutional government throughout previous and future generations requires, as it always has, a dedication on the part of the citizenry to participate actively in the political process and to demonstrate that respect owed to the nation's elected officials and institutions. The people at NGA recognize this duty and the specialized part that each person plays in securing the nation and its democratic heritage.

The agency fulfilled a decisive and acknowledged role during the preparations and events surrounding the 56th presidential inauguration. Several articles in this issue expand upon the support provided by the agency in concert with its domestic partners. Beginning with "Presidential Inauguration Connects a Community," the reader will discover a web of complementary geospatial efforts coordinated among NGA Support Teams that helped protect the transition of power by aiding the operations of the U.S. Secret Service, the FBI, the Federal Emergency Management Agency and the Department of Defense.

American democracy is not alone in facing threats. The terrorist attacks in Mumbai, India, in November 2008 cruelly underlined this all-too-common reality. NGA responded to this crisis with the same determination that has become a hallmark of the agency. As author Matt Higham explains, NGA provided essential geospatial analysis and context, serving the needs of its partners investigating the attacks. This crucial operation communicates the value of coordinated, unified analytical cooperation.

Additional articles will remind readers of the technical enhancements that continue to propel geospatial intelligence, from the agency's newest mobile support vehicle to an innovative pilot project serving the U.S. Central Command.

Then, explore the connection between NGA deployed analysts and the celebrated Lawrence of Arabia with NGA historian Dr. Gary Weir. Finally, take a walk through the Smithsonian Institution's National Air and Space Museum Steven F. Udvar-Hazy Center as Weir shares the history of the many artifacts on display at the museum either donated by NGA or that relate directly to the agency's history.

This issue presents just a few of the varied and critical elements of NGA's support to national security. The next issue, July/August, will focus on the agency's support to the nation's military services and servicemembers.

Paul R. Weise
Director, Office of Corporate Communications

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GETTING PUBLISHED
All members of the geospatial intelligence community are welcome to submit articles of community-wide interest. Articles are edited for style, content and length. For details on submitting articles, send an e-mail to pathfinder@nga.mil.

DNI Blair Announces Plan for the Next Generation of Electro-Optical Satellites

By the Office of the Director of National Intelligence

Director of National Intelligence (DNI) Dennis C. Blair announced on April 7, 2009, that the Office of the DNI, along with the Department of Defense (DOD), has put together a plan to modernize the nation's aging satellite-imagery architecture by prudently evolving government-owned satellite designs and enhancing use of U.S. commercial providers.

"Imagery is a core component of our national security that supports our troops, foreign policy, homeland security and the needs of our Intelligence Community," Blair said. "Our proposal is an integrated, sustainable approach based on cost, feasibility and timeliness that meets the needs of our country now and puts in place a system to ensure that we will not have imagery gaps in the future.

"When it comes to supporting our military forces and the safety of Americans, we cannot afford any gaps in collection," Blair added. "We are living with the consequences of past mistakes in acquisition strategy, and we cannot afford to do so again. We've studied this issue, know the right course, and need to move forward now."

The joint decision by the DNI and DOD was based on the results of multiple government studies over the past several years and on the findings and recommendations of an independent panel of former defense and intelligence experts convened by Blair to assess the U.S. government's review. The studies examined imagery needs, alternative architectures, cost and affordability, technological risk and industry readiness.

Key features of the final plan endorsed by both the DNI and the DOD include:

- Government-owned satellites would be developed, built and operated by the National Reconnaissance Office (NRO). The unique capabilities of these satellites, evolved from existing designs, would give the nation a timely, and often decisive, information advantage.
- The DOD and the Intelligence Community would increase the use of imagery available through U.S. commercial providers. This additional capability would provide the government with more flexibility to respond to unforeseen challenges. These less-complex satellites, which are based on technologies already in production by U.S. vendors, would be available sooner than the much more capable NRO-developed and -acquired systems, making them especially useful as a near-term supplement and backup to the government's existing imagery architecture.
- NGA would continue to provide the infrastructure that integrates capabilities as well as imagery products, all of which would be available on a timely basis for military, intelligence, foreign policy and civilian users.

Director of National Intelligence, Dennis C. Blair

Once Congress approves funding for the plan, implementation will begin in the next several months. The commercial imagery elements of the architecture would likely be operational in the next several years. The overall architecture would be fully deployed before the end of the next decade.

The DNI oversees 16 federal organizations that make up the U.S. Intelligence Community. Additionally, the DNI serves as the principal intelligence adviser to the president, the National Security Council and senior policy makers.

Presidential Inauguration Connects a Community

By Michelle Bonifas

NGA support for the 56th presidential inauguration in Washington, D.C., demonstrated the ability of the agency to connect an entire crisis and consequence management community consisting of federal, state and local government partners in preparing for possible attacks against the president and other participants in the ceremonies of Jan. 20, 2009. The Department of Homeland Security (DHS) named the inauguration of President Barack Obama a National Special Security Event (NSSE) of the highest level, requiring all agencies supporting it to exercise due diligence to prevent attacks and prepare to respond to any incidents. NGA personnel embedded with the U.S. Secret Service, the FBI, the Federal Emergency Management Agency (FEMA) and the Department of Defense effected precise and real-time geospatial Intelligence (GEOINT) to fulfill these partners' critical needs, based on a shared, collaborative understanding of the mission.

Crisis management and consequence management are distinct missions, and NGA supports both. The FBI performs crisis management after a terrorist attack on the United States as the lead federal agency managing all domestic aspects of intelligence, investigation and law enforcement activities. FEMA, a component of DHS, performs consequence management when responding to a domestic terrorism event as the lead agency coordinating the federal government's support to an affected area and victims. As the lead federal agency responsible for implementing and planning security, the Secret Service, another DHS component, plans extensively with federal partners to prevent an attack from occurring during an NSSE. If a terrorist attack were to occur, the Secret Service would safely secure and transfer any government officials it was charged to protect.

Planning for an NSSE begins months in advance, and President Obama's inauguration was no different. The inauguration, which may have been the largest NSSE that NGA has ever supported, started with planning and data sharing among not only the numerous federal agencies involved, but also the many state and local government officials that share crisis and consequence management responsibilities. Planning for an event in the National Capital Region poses many challenges to data and information sharing because of the numerous federal offices and property surrounding the event locations.

While the Secret Service and the FBI concentrated on security and counterterrorism planning, FEMA worked busily with state and local governments to plan responses to a possible attack or other crisis. All aspects of the planning involved NGA. Agency personnel delivered numerous briefings and thoroughly shared how GEOINT support would bring together the community of agencies, governments and people involved through a geospatially enabled common operating environment.

For several days prior to the inauguration and for several days after, NGA personnel embedded with the Secret Service, the FBI, FEMA and other partners at

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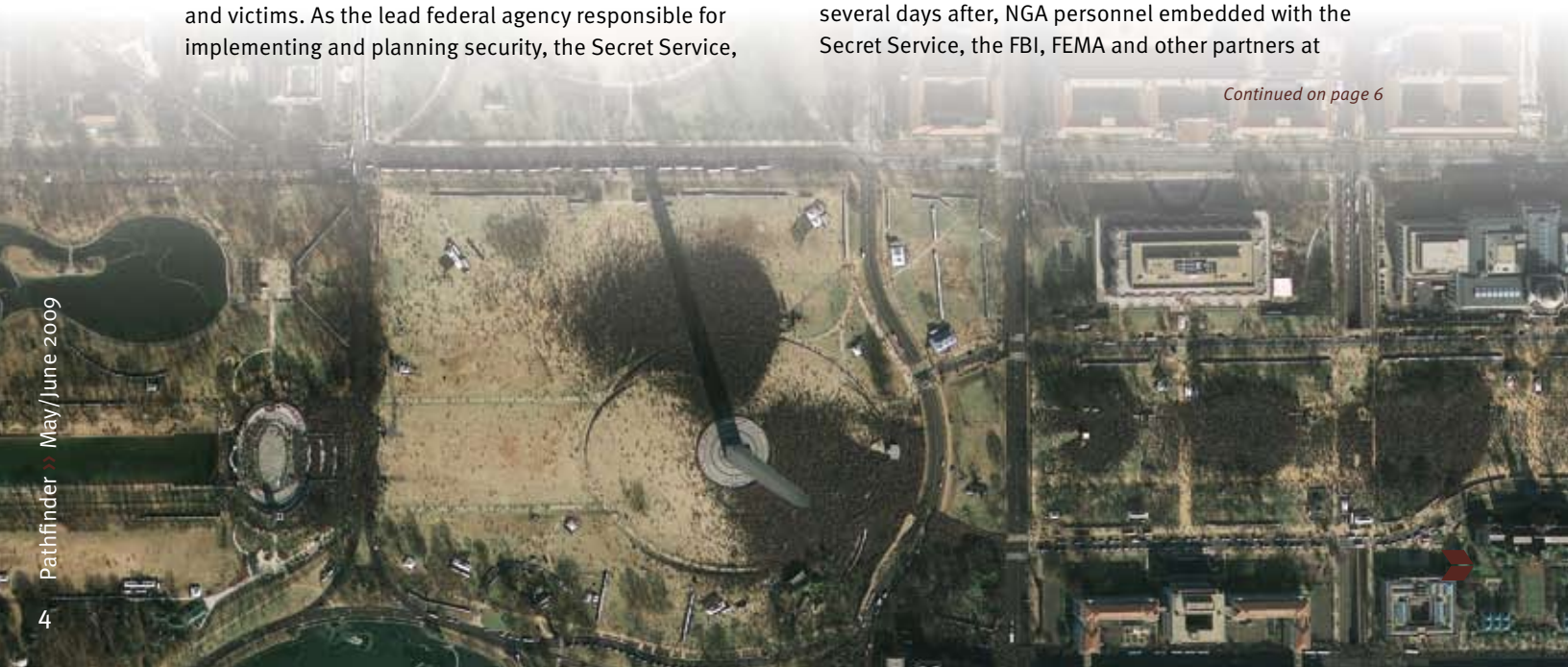

Inauguration Support to the U.S. Secret Service

By Chris Vaughan

The 56th presidential inauguration again proved that NGA remains at the forefront of cutting-edge geographic information system technologies. For this special event, the NGA team supporting the U.S. Secret Service delivered a total package consisting of high-resolution commercial satellite imagery, airborne imagery and immersive imagery (hand-held or ground view photography) of event venues to the agency's mission partners, rendering a 360-degree view of their operational environment.

Immersive Imagery

A key benefit of immersive imagery is the ability to accurately depict an area of interest with realistic detail. Over the last several years, NGA has streamlined the delivery of massive amounts of data to end users through the use of online services. Immersive imagery, much like commercial satellite imagery, faces the same technical challenges regarding storage, access and dissemination.

For the inauguration, NGA ensured that forward-deployed partners had an online warehouse of immersive imagery available. Pulling from various imagery vendors, partners could choose from a streaming feed of imagery or from selected feeds of digital 360-degree stills to enhance a user's situational awareness. From an operational standpoint, decision makers could easily immerse themselves from a desktop environment into a complex, 3-D world.

Palmtop Computers

In support of the inauguration, NGA provided homeland security partners with palmtop computers used to watch the event feed from NGA's recently updated Web application Palanterra™, a family of interfaces for consolidating and disseminating geospatial Intelligence (GEOINT) resources. With an approximately seven-inch screen, the palmtops featured an integrated cellular modem, access to an unclassified network for official use, NGA's Google Earth™ system and a Web browser, all running on a standard operating system. The computers ensured that NGA mission partners could take full advantage of GEOINT resources whether in a command center or on the street.

Service-Oriented Architecture

NGA analysts also made extensive use of the agency's expanding geographic information system services through NGA's service-oriented architecture (SOA), an information technology approach that allows developers as well as users to blend data stores from many providers to create unique looks into the available data. SOA allows NGA to reach out to all mission partners.

Palanterra™ X3, released just prior to the inauguration, typifies the use of SOA. Palanterra™ developers worked hard to integrate data from many sources into their application and make that data available to end users. In addition, developers added a new feature

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Crowds gather for the 56th presidential inauguration in Washington, D.C., on Jan. 20, 2009.

Satellite image courtesy of GeoEye ©2009.

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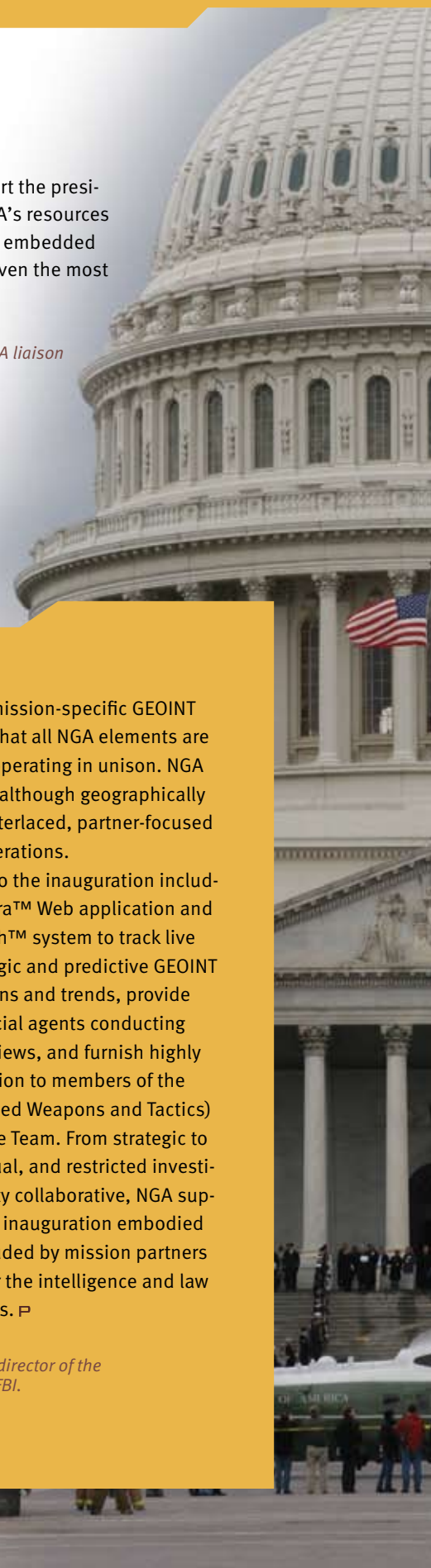
locations throughout the National Capital Region provided onsite GEOINT analysis, maps, data and imagery used for security planning and implementation. Each organization received support tailored to its particular needs, including commercial imagery and infrastructure data and event-specific information.

Active collaboration between NGA and its mission partners in the crisis and consequence management community allows the agency to continue to meet evolving GEOINT requirements. As demonstrated by the agency's efforts to support the presidential inauguration, NGA's resources and extensive network of embedded personnel are ready for even the most critical missions.

Michelle Bonifas is the NGA liaison officer at FEMA.



Inauguration Support to the FBI

By Chris Viselli

NGA's collaborative support to the FBI during the 56th presidential inauguration marked seven years of deploying to support the bureau and other lead federal agencies during National Special Security Events. The agency has conducted over 50 field deployments in those seven years, reflecting mission partners' increasing reliance on NGA. In true collaborative fashion, NGA analysts were embedded in a number of FBI command centers, including the bureau's Joint Operations Center, Intelligence Operations Center and Tactical Operations Center. Each of these command centers seamlessly ties together and shares crisis management, intelligence and counterterrorism missions with the Secret Service, the Federal Emergency Management Agency (FEMA), and other federal, state and local security partners and first responders.

While providing dedicated geospatial intelligence (GEOINT) to inaugural activities, embedded NGA teams used a wide array of collaborative tools to maintain constant, real-time communication with agency teams located with the Secret Service, FEMA and the Armed Forces Inaugural Committee and at other locations. Using this model, NGA leads in providing dedicated, mission-specific GEOINT support, while ensuring that all NGA elements are connected virtually and operating in unison. NGA homeland deployments, although geographically dispersed, function as interlaced, partner-focused and well-coordinated operations.

Specific NGA support to the inauguration included use of NGA's Palanterra™ Web application and the agency's Google Earth™ system to track live incidents, perform strategic and predictive GEOINT analysis of activity patterns and trends, provide rapid analysis to FBI special agents conducting investigations and interviews, and furnish highly focused tactical information to members of the bureau's SWAT (Specialized Weapons and Tactics) team and Hostage Rescue Team. From strategic to tactical, hardcopy to virtual, and restricted investigative to cross-community collaborative, NGA support to the FBI during the inauguration embodied the best practices applauded by mission partners as a successful model for the intelligence and law enforcement communities.

Chris Viselli is the deputy director of the NGA Support Team at the FBI.

The U.S. Capitol hosts preparations for the inauguration of President Obama.

DOD Photo

(Continued from page 5)

that allows Palanterra™ users to add their own content to customize their GEOINT experience using data that the user maintains. Palanterra™ proved very popular because it requires only a Web browser and Internet access to use. The 400,000 Palanterra™-generated map draws on Jan. 20 alone validated the SOA approach.

Users also enjoyed a 3-D option made possible by pairing NGA's version of Google Earth™ with the agency's Geospatial Intelligence Advancement Testbed (GIAT), which is charged with innovating new GEOINT solutions. The GIAT team provided this augmented experience by connecting with many of the same sources as the Palanterra™ team. For example, the GIAT team ingested the Palanterra™ team's event feed and added 3-D features, including models of key Washington, D.C., landmarks, to provide enhanced GEOINT for NGA's mission partners using the agency's Google Earth™ system.

Although often behind the scenes, GEOINT resources assisted the agency's numerous partners with carrying out their respective duties with precision. With major responsibilities before and during the inauguration, the NGA team assigned to the Secret Service delivered a substantial portion of GEOINT to ensure a secure transition of power.

Chris Vaughan is a geospatial intelligence analyst assigned to the U.S. Secret Service.

Inauguration Support to FEMA

By Michelle Bonifas

NGA continued its ongoing collaboration with the Federal Emergency Management Agency (FEMA) during the 56th presidential inauguration. As it does for all National Special Security Events, FEMA coordinated the federal government's preparations for and response to all domestic disasters, natural or man-made, including acts of terrorism.

In the Washington, D.C., metropolitan area, FEMA activated and staged Urban Search and Rescue (US&R) teams comprising state and local first responders. For more than 10 years, NGA has provided crucial tactical geospatial intelligence (GEOINT) in the field to US&R teams during crises, and the inauguration proved no exception. NGA deployed its Domestic Mobile Integrated Geospatial-Intelligence System (DMIGS) to the US&R staging area to be ready to assist first responders, had they been called into action. DMIGS, a mobile, self-contained command vehicle, enables deployed NGA analysts to work onsite and collaborate remotely on analysis and time-critical products.

The NGA team in the DMIGS provided numerous on-demand GEOINT products to US&R operations, including commercial imagery and gridded search reference graphics. Being fully integrated with FEMA's US&R operations, NGA analysts provided not only requested information but also predictive analysis to aid first responders in mission planning.

NGA continues to work closely with FEMA and US&R teams. As recently as March 2009, the agency deployed to support US&R operations in North Dakota in response to major flooding, demonstrating that the inauguration was another one on a long list of events and crises during which NGA has successfully provided critical GEOINT to the nation's first responders.

Michelle Bonifas is the NGA liaison officer at FEMA.

Inauguration Support to the Department of Defense

By Richard Hanes

Tailored GEOINT products developed by NGA helped ensure a successful inauguration.

Through the biting cold of a picturesque January afternoon, the loudspeakers echoed across the National Mall, "... and will to the best of my ability, preserve, protect and defend the Constitution of the United States, so help me God." With these words, Barack Obama became the 44th president of the United States. While millions watched the proceedings, NGA Support Teams (NSTs) worked behind the scenes to aid in the peaceful transition of power. Exemplifying these teams, the NST supporting the U.S. Northern Command (NORTHCOM), in concert with other teams, assisted the Department of Defense (DOD) and the Armed Forces Inauguration Committee (AFIC), which manages the military aspects of presidential inaugurations.

Throughout the inauguration and the time leading up to it, analysts from the NORTHCOM NST and other agency elements monitored events and incorporated geospatial information from several sources into NGA's Palanterra™ Web application to provide a common operating picture. Prior to the inauguration, deployed NGA personnel standardized the way that the application represented all DOD elements involved. Before and during the ceremonies, analysts provided direct support to AFIC, creating planning tools included in Palanterra™. While the DOD Blue Force GPS tracking system monitored air, ground and maritime locations on the historic day, NGA analysts also incorporated this data into the system to display any critical incidents at 15-minute intervals.

A real-time incident provided an example of how analysts respond quickly to critical information. Sens. Ted Kennedy and Robert Byrd both collapsed during the inauguration luncheon, delaying the start of the inaugural parade and subsequent activities. The NGA teams promptly updated the status of the affected celebrations within Palanterra™ so that everyone remained on the same schedule at all support sites.

The essential collaboration between DOD and NGA, led by the NORTHCOM NST, fulfilled a crucial link. NORTHCOM and the DOD continue to benefit from the skill of NSTs as geospatial intelligence gains increasing influence. Through successful deployments such as the inauguration, the NORTHCOM NST and other agency teams continue to foster strong, collaborative relationships with domestic partners. P

Richard Hanes is a geospatial analyst with the U.S. Northern Command NGA Support Team.

Second-Generation Command Vehicle Enhances Homeland Deployments

By Al Trujillo

In the first week of January 2009, the NGA Deployable Systems Program Management Office delivered on time and within budget the second-generation Domestic Mobile Integrated Geospatial-Intelligence System (DMIGS 2) to the NGA Office of Global Support (OGS). Based on a heavy-duty command vehicle, the system provides the robust mobility required for domestic security and disaster response.

Based on lessons learned from the original DMIGS acquisition and deployments, the DMIGS 2 provides greater tools to support national emergencies and security events. Unlike the first DMIGS, which was engineered in 2006 from a command vehicle already in production, the DMIGS 2 was built from the ground up based on specific requirements from design through manufacturing. By executing an aggressive strategy, the agency accomplished the entire acquisition and systems engineering process in less than a year, even though vehicle production alone would typically exceed that. The result, a state-of-the-art early response vehicle, is now the flagship of NGA's deployable analytical capability. P

Al Trujillo is the program manager for NGA Deployable Systems and the DMIGS and DMIGS 2 acquisitions.

NGA Photo

Response to Mumbai Attacks Confirms Unified Operations Concept

By Matt Higham

On the afternoon of Nov. 26, 2008, 10 terrorist operatives began an assault on the Indian city of Mumbai. They attacked the main railway station, a movie theater, a hospital, two hotels, a Jewish outreach center and two popular restaurants, killing some 170 people over the course of 60 hours. NGA analysts worked in conjunction with colleagues from across the National System for Geospatial Intelligence and with other partners to inform U.S. policymakers and law enforcement officials responding to the crisis and subsequent investigation.

The terror attacks and NGA's response demonstrated the importance of applying Unified Geospatial-intelligence Operations (UGO) principles. The UGO concept emphasizes coordinated efforts to align and fulfill geospatial intelligence (GEOINT) requirements throughout the Intelligence Community (IC). Introduced in 2004, the UGO framework principles have increasingly informed GEOINT analysis and production. Among these are:

- Optimize access to data.
- Eliminate unwanted duplication.
- Maximize collaborative analysis.
- Drive implementation of new technologies, tools and methods.

Following the attacks, Indian officials quickly and publicly blamed terrorists originating from neighboring Pakistan for the assault. Because India experiences regular small-scale terrorism, the Indian public has increasingly demanded that the government take action to prevent future attacks. Given the sophisticated, high-profile, high-casualty attacks in Mumbai, an Indian military response against Pakistan seemed almost inevitable. The United States sought to prevent such a conflict, particularly since both India and Pakistan possess a nuclear arsenal.

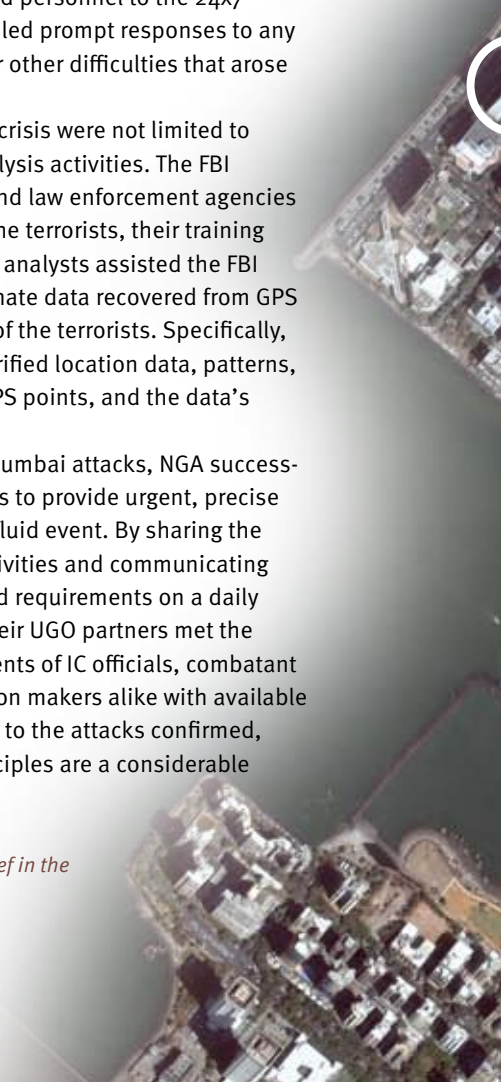
Within days of the attack, NGA analysts familiar with southern and Southeast Asia shifted to crisis response, working extended hours and weekends to provide essential analysis to IC colleagues and policy makers. The value of UGO quickly became apparent as additional NGA analytic components stepped forward to assist with the workload. Communicating daily with colleagues, analysts contributed valuable information and experience related to India, Pakistan, weapons of mass destruction and other issues to daily IC reporting. Frequent communication exemplified UGO by bringing together analysts from multiple NGA directorates, NGA support teams at combatant commands and integrated operations centers, and other mission partners to discuss developments, collection issues and reporting requirements.

At the same time, an agency team began a 24x7 operation at the NGA Command Center in Bethesda to manage, coordinate and fulfill official assignments and provide up-to-the minute information on the latest crisis developments to NGA senior leaders. Every major NGA component contributed personnel to the 24x7 operation, which also enabled prompt responses to any technical, administrative or other difficulties that arose during the crisis.

NGA's efforts during the crisis were not limited to traditional intelligence analysis activities. The FBI aided Indian intelligence and law enforcement agencies in their investigation into the terrorists, their training and their preparation. NGA analysts assisted the FBI with understanding coordinate data recovered from GPS units found on the bodies of the terrorists. Specifically, analysts examined and clarified location data, patterns, the environment around GPS points, and the data's overall significance.

In the aftermath of the Mumbai attacks, NGA successfully applied UGO principles to provide urgent, precise GEOINT for a complex and fluid event. By sharing the workload, coordinating activities and communicating their analytical findings and requirements on a daily basis, NGA analysts and their UGO partners met the pressing GEOINT requirements of IC officials, combatant commands and U.S. decision makers alike with available resources. As the response to the attacks confirmed, correctly applied UGO principles are a considerable force multiplier. P

Matt Higham is a branch chief in the Office of Asia-Pacific.



On Nov. 26, 2008, terrorists attacked multiple locations in Mumbai, India, including the Trident-Oberoi (left) and Taj Mahal Palace (right) hotels.

Satellite image courtesy of DigitalGlobe ©2009

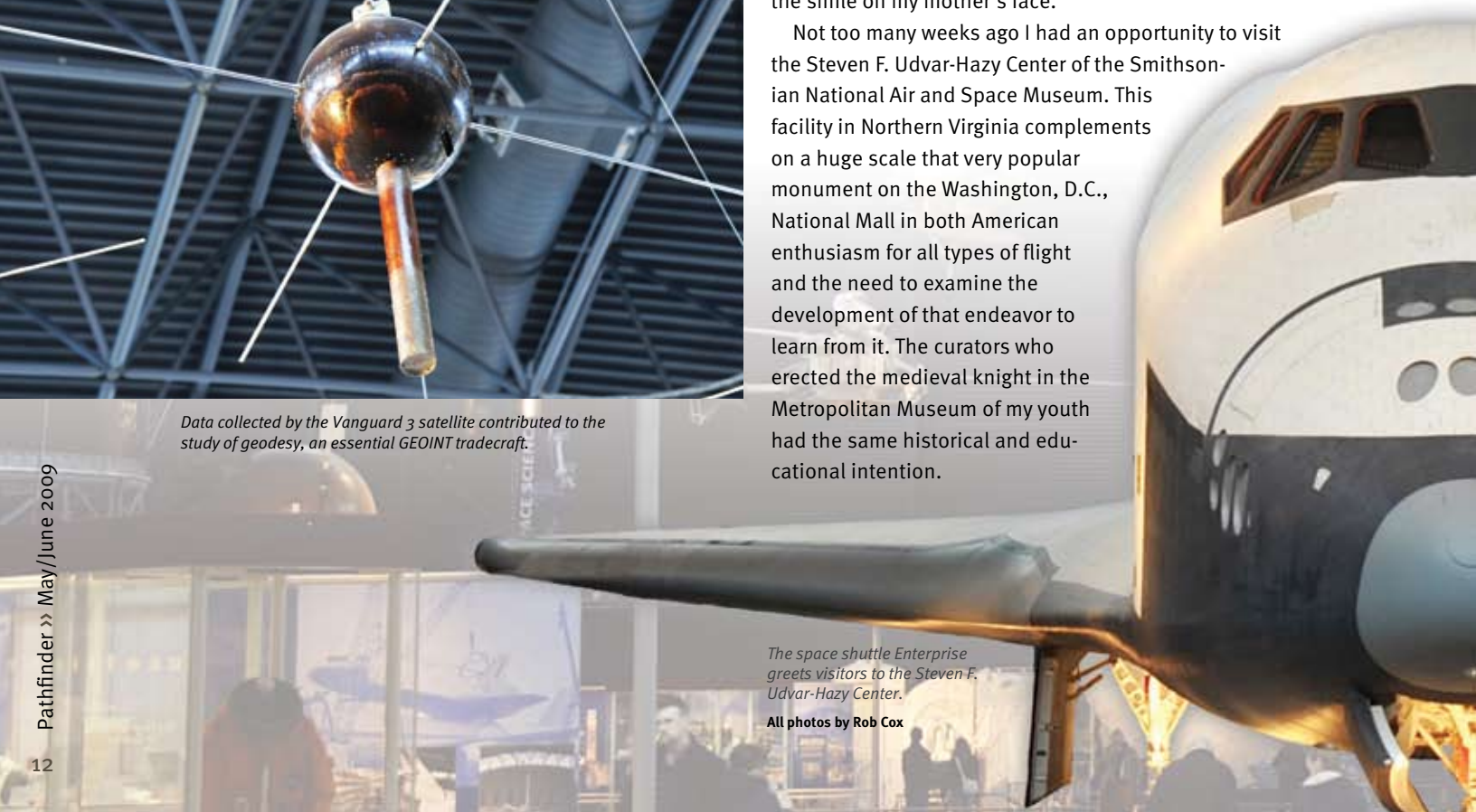
National Air and Space Museum Udvar-Hazy Center Exhibits GEOINT History

By Dr. Gary E. Weir

When I was a child I took a trip with my mother beyond the museum walls. She had a passion for history and its mysteries. Thus the considerable historical resources in my hometown, New York City, made family museum visits both regular and an adventure. In one case, during my second grade year we visited the Metropolitan Museum of Art to see its Egyptian collection, complete with my sister in a stroller and my dad seemingly laden with all of the supplies necessary to scale Mount Everest. Just before we left the museum, my mother had an idea. She wanted me to see the knights. As we rounded a corner into the exhibit, all of the mystery of centuries past rode out to meet me. At the very entrance to the exhibit, the curators had erected an absolutely realistic, full-scale model of a medieval knight on horseback that towered over me. The war horse had its complement of armor, as did the knight, his helmet decorated with animal horns at the left and right. In his hand he held firm a long lance, extending forward with three blades protruding from the tip. This fellow meant business. His shield carried his coat of arms, and he leaned forward with determination. I stood there speechless for a time, experiencing the mystery my mother always described, understanding now the reality of all she had told me. In the context of her stories, that knight and I left the hall for a few moments, and in my imagination I watched him do battle in medieval France. The museum walls meant nothing. I saw it all, including the smile on my mother's face.

Data collected by the Vanguard 3 satellite contributed to the study of geodesy, an essential GEOINT tradecraft.

Not too many weeks ago I had an opportunity to visit the Steven F. Udvar-Hazy Center of the Smithsonian National Air and Space Museum. This facility in Northern Virginia complements on a huge scale that very popular monument on the Washington, D.C., National Mall in both American enthusiasm for all types of flight and the need to examine the development of that endeavor to learn from it. The curators who erected the medieval knight in the Metropolitan Museum of my youth had the same historical and educational intention.



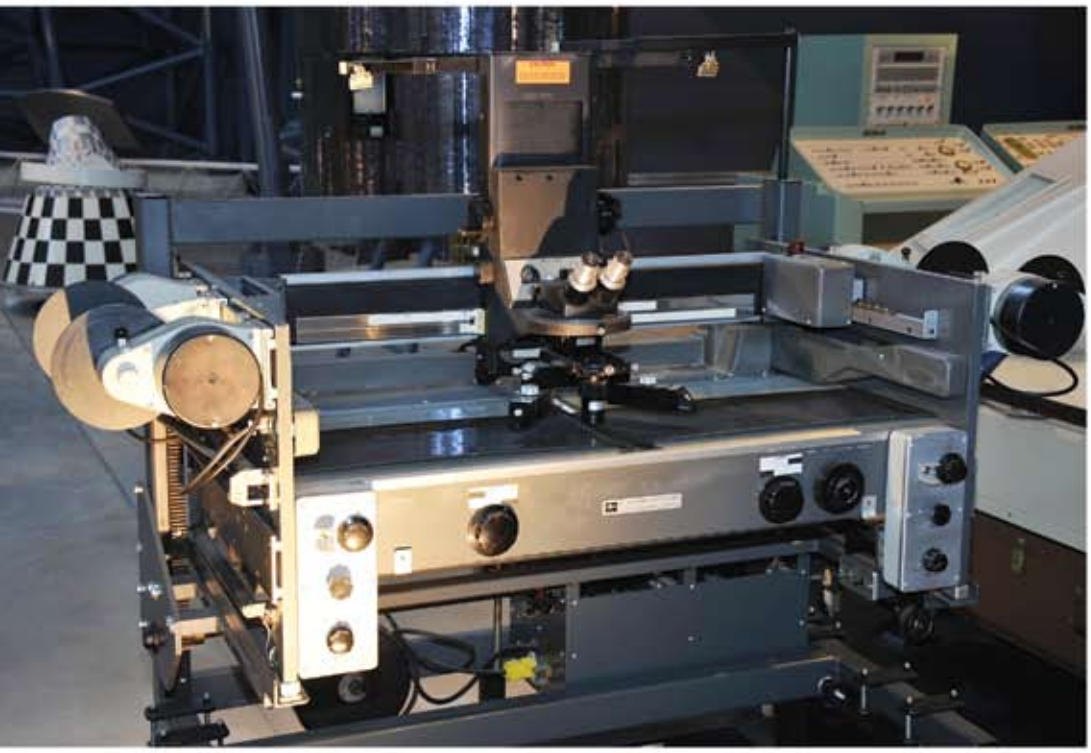
The space shuttle Enterprise greets visitors to the Steven F. Udvar-Hazy Center.

All photos by Rob Cox

As I rounded a corner from the flight exhibits and aircraft into the space hall along with my colleagues from NGA, I came nose to nose with the space shuttle Enterprise. Once again the walls disappeared. The size of the shuttle dwarfed me—as did that medieval knight 50 years ago—and all of the memories came flooding back of those early mornings before school watching television coverage of astronauts Alan Shepard, Gus Grissom and John Glenn, and of Neil Armstrong's 1969 walk on the moon. I did not visit medieval France, dependent upon my mother's stories. This huge artifact played a role in my personal history while becoming, along with the manned capsules, satellites, and moon landing craft, a part of the national cultural fabric and common memory. Many who visited the museum with me at that moment experienced all at once not four walls containing interesting hardware, but rather their own lives and the progress of the nation taking steps beyond the museum building and into a realm of endless discovery and adventure.

If parents and children desire it, good museums will always propel them beyond the walls. On the same day we visited, I observed many families congregating at various parts of the space hall exhibits. My medieval knight once again came to mind as I watched a father and young son looking high up at an artifact hanging from the ceiling. Observing them I realized that the boy had noticed one of NGA's contributions to this museum. He had discovered the extending arm from the Shuttle Radar Topography Mission, or SRTM, that went into space on board the shuttle Endeavour in 2000, when NGA was known as the National Imagery and Mapping Agency (NIMA). The arm now extends across the ceiling at the Udvar-Hazy Center as it did in space when it helped collect topography data for over 80 percent of the Earth's landmass, which sustains 95 percent of the planet's population. This product, used in conjunction with NASA, permitted the astronauts and ground-based scientists to employ a technique called radar interferometry to effect the collection. Launched from the Kennedy Space Center at 12:44 p.m. EST on Feb. 11, Endeavour spent 11 days in flight, returning on Feb. 22. The crew responsible for the operation of the SRTM spent 222.4 hours, almost nine days and eight hours, recording topographical data during repeated orbits 145 miles above the Earth. After the mission, NASA duplicated the data tapes for the Jet Propulsion Laboratory, which processed and released them to NIMA one continent at a time. Over the next two years the staff at NIMA refined the data, identifying and resolving anomalies and making the information compatible with the agency's standard Digital

A mapping camera like this one captured images of the lunar surface that NIMA, now NGA, converted into the first lunar globe.



A classic photo interpreter's light table echoes the history of imagery analysis.

Terrain Elevation Data, DTED®, protocols. With the completion of all related tasks in 2004, this highly successful mission achieved its goals with a budget that would have permitted, without SRTM, only about 7.7 percent of the desired results. Furthermore, gathering comparable data by traditional means would have taken at least 20 years. These data still inform NGA's cartographic and foundation science tradecrafts.

Not too far from the spot that permits the best view of the SRTM arm, in a case full of cameras, a visitor can quickly discover the kind of camera used in conjunction with NASA to capture surface images of the moon that NIMA converted into the first lunar globe. You can find that globe in the collection at the NGA museum in St. Louis.

Moving from the real to the virtual became important to NIMA in the early 1990s. NGA has donated artifacts to the Smithsonian that not only demonstrate the analog tradition but also others that illuminate the agency's first steps into the digital future. At the tip of the shuttle Enterprise's port wing, the visitor to the Udvar-Hazy Center can find the classic photo interpreter's light table, for years the most important tool used in imagery reading and analysis and still not absent from many analytical

Using this extending arm, the Shuttle Radar Topography Mission collected Earth topography data from the shuttle Endeavour in 2000.

All photos by Rob Cox

The Imagery Data Exploitation II, IDEX II, system revolutionized the accessibility and exploitation of imagery.

spaces in NGA today. In 2005 NGA presented a Cutler-Hammer AIL MLT 1540 light table with a Bausch and Lomb Zoom 240 lens set to the Smithsonian. The Richards Corporation built most NIMA and NGA light tables, so this represents an exception, but the NGA artifact collection now holds 22 light tables, most of which came from the Richards plant, each representing a significant change in both tradecraft method and table development.

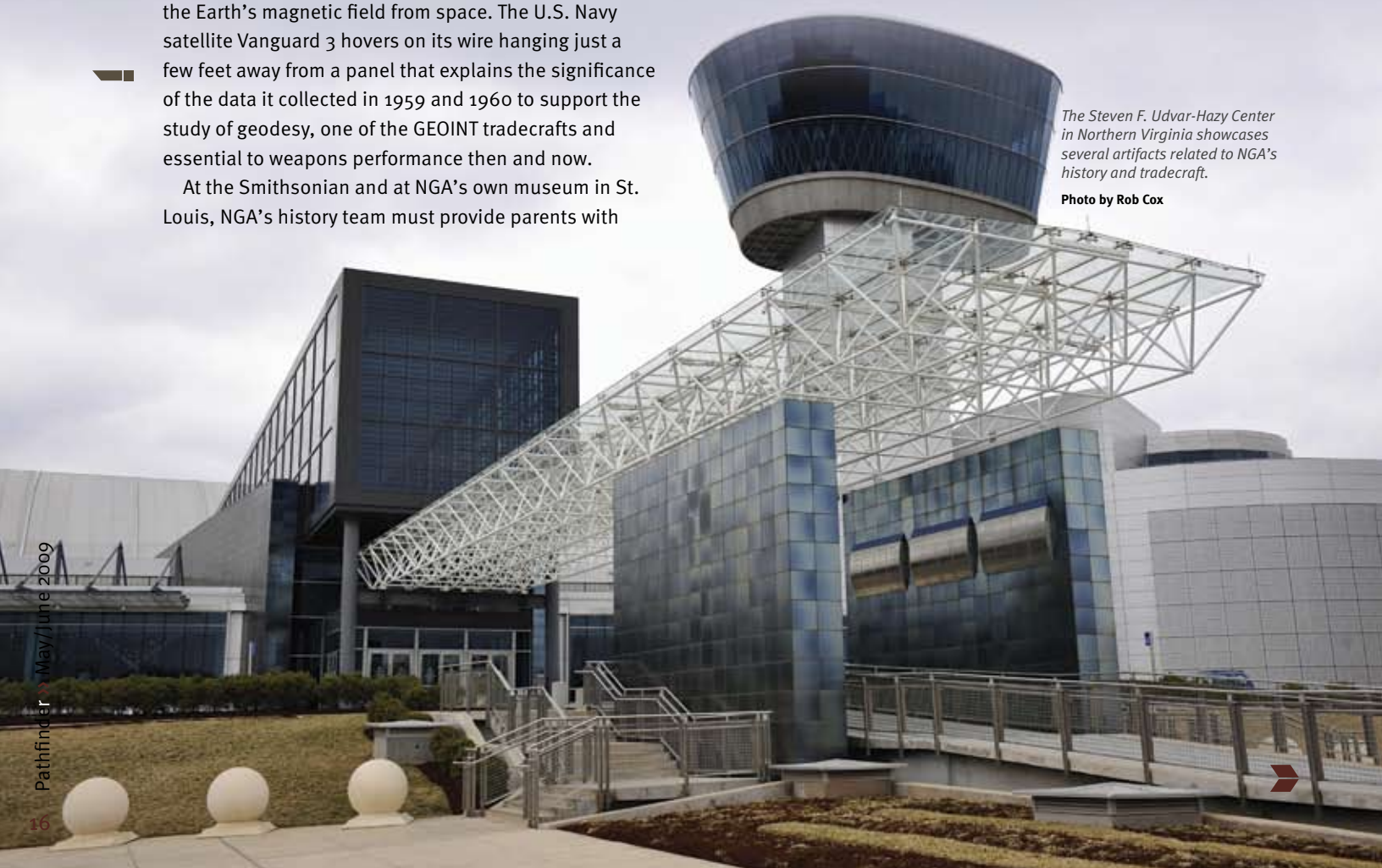
Immediately next to the light table on the exhibit floor, the digital Imagery Data Exploitation II, or IDEX II, system demonstrates a revolution in imagery accessibility, sharing and analysis. Implemented in 1990 to complement or surpass the light table, the IDEX II in most instances shifted the use of hardcopy imagery and film from the light table to a digital system that could automate the capture, dissemination and

retention of imagery. This opened the imagery libraries to many more analysts at the same time and at many more locations. During its lifetime, the IDEX surpassed industry standards with the best monochrome and color monitors, while at the same time employing a 4 GHz system speed when the industry average reached only 4.77 MHz. The last IDEX II went offline on July 1, 2003, marking both 12 years of service and an ambitious introduction of digital technology to the analytical mission. At the Udvar-Hazy facility, both of these tools stand among a cluster of satellites and collection systems that fed lifeblood imagery to NGA and its predecessors. The same 2005 donation to the Smithsonian that included the Cutler-Hammer Light Table also provided this full IDEX II system, brother to the additional IDEX presently in the NGA collection.

Geospatial intelligence (GEOINT) tradecrafts and their tools have become part of the nation's collective memory and an integral part of the cultural experience of space exploration. In the same space that will soon provide an entrance into a new wing of the Udvar-Hazy Center, one can also find replicas of some early efforts to measure the Earth's magnetic field from space. The U.S. Navy satellite Vanguard 3 hovers on its wire hanging just a few feet away from a panel that explains the significance of the data it collected in 1959 and 1960 to support the study of geodesy, one of the GEOINT tradecrafts and essential to weapons performance then and now.

At the Smithsonian and at NGA's own museum in St. Louis, NGA's history team must provide parents with ways to help their children understand this amazing world and its fascinating past. In this way history may help a young person shape a fulfilling future. Given GEOINT's presence in the space hall at the Smithsonian's Udvar-Hazy Center, another second-grader may very well remember 50 years from now that he or she one day left the walls of the museum behind on a journey into space and the modern American experience because of a memory or inspiration provided by the tools NGA used to perform its mission. I would not be surprised. After all, it is part of NGA's mission to show the way.

Dr. Gary E. Weir is the NGA Historian.



The Steven F. Udvar-Hazy Center in Northern Virginia showcases several artifacts related to NGA's history and tradecraft.

Photo by Rob Cox

NGA Team Accelerates CENTCOM Intelligence Delivery

By Juanita Hartbarger

Geospatial intelligence (GEOINT) is a foundation for collaboration throughout the Intelligence Community (IC) as it supports the warfighter and the decision makers. This is one of NGA Director Vice Adm. Robert B. Murrett's fundamental messages. The NGA Support Team (NST) at U.S. Central Command (CENTCOM) gets it, as an innovative pilot program developed by the NST has proven.

Starting with GEOINT as the foundation upon which all other information sources are layered to develop actionable intelligence for the frontline, the technical executive (TX) at the CENTCOM NST decided to marry GEOINT with information technology to get actionable GEOINT to the warfighter faster and smarter. The result: the Data Production Environment (DPE).

The Challenges

Timeliness, a fundamental element of NGA's mission, was the focus of the DPE initiative. Why? The NST's TX described the working environment this way: "Before we launched the DPE initiative, our analysts [civilian and military] had to log on to multiple systems to access the mountain of data they needed to do their jobs." There had to be a better way for NGA to maintain its record of effective collaboration in the face of the increasing volume of GEOINT. The TX and his team set out to find that better way.

The team identified three challenges. First, they had to develop a tool that would allow analysts to efficiently and effectively discover and capture information. Second, they needed to create products for GEOINT analysts (both NGA and military) and their mission partners to use in visualizing that information—to see a common operating picture. Third, they had to design a tool to

disseminate those products in the fastest possible way to the command's warfighters.

The Plan

The NST's technical team rolled out a two-stage plan. First, they looked at all the tools available to the analysts, and then they studied the command's existing GEOINT workflow to determine how to improve the effectiveness of those tools.

The team found that visualization was key. As the TX noted, "Visualization was the common thread in sharing GEOINT and in collaborating with NGA's mission partners in GEOINT development and analysis." Visualization is especially important for an NST supporting a combatant command because military imagery, geospatial and all-source analysts work side by side with their NGA counterparts. NGA had already led the way in the use of commercial visualization technology—Google Earth™—as a tool for GEOINT collaboration by the time DPE was initiated. It made sense, therefore, for Google Earth™, already one of NGA's enterprise services, to become the foundation for DPE.

Next, the team looked at how analysts did their work and what they needed to do it better. The team had to answer those two questions to design procedures that served not only the analyst's workflow but also the mission partner's operational tempo.

The team determined to provide all CENTCOM directorates with a single interface to visualize GEOINT and all-source intelligence, to quickly produce it in a streamlined, automated fashion, and to deliver it where it's needed, when it's needed. In the words of the TX, "As our forces confront increasingly adaptive threats, the technology infrastructure must adjust rapidly or the technology will become a burden, not an advantage."

The team secured the services of two full-time, onsite developers from NGA's GEOINT Visualization Services program office, who sat with analysts and studied their workflow. This allowed the developers to customize Google Earth™ to automate most of the analysts' tasks.

The Outcomes

Is it working? If the words of the analysts participating in this pilot project are any indication, the answer is a resounding "Yes." As a CENTCOM target specialist stated, "Once we saw how quickly they [the DPE developers] gave us exactly what we asked for, we started developing our own efficiencies. They started us thinking about seriously streamlining our workflow."

One CENTCOM imagery analyst noted that "DPE is changing the culture from a Cold War intelligence mentality to a streamlined, modern process that makes collaboration work better and faster." Observed another target analyst, "With the DPE approach, gone are the days of too many mouse clicks and too little analysis."

With this kind of success, DPE has grown beyond just CENTCOM. Because this tool is so effective, NGA is now shipping DPE to its IC mission partners around the world so that they can better support the men and women in harm's way.

The TX summed it all up. "By marrying the business process and the information technology, DPE enhances our ability to quickly get the data from headquarters to the tip of the spear." It's all about fulfilling the mission in the most efficient, effective and timely way possible. P

Juanita Hartbarger is a public affairs officer with NGA's Office of Corporate Communications.

Regional Analysts, Deployers and Legends

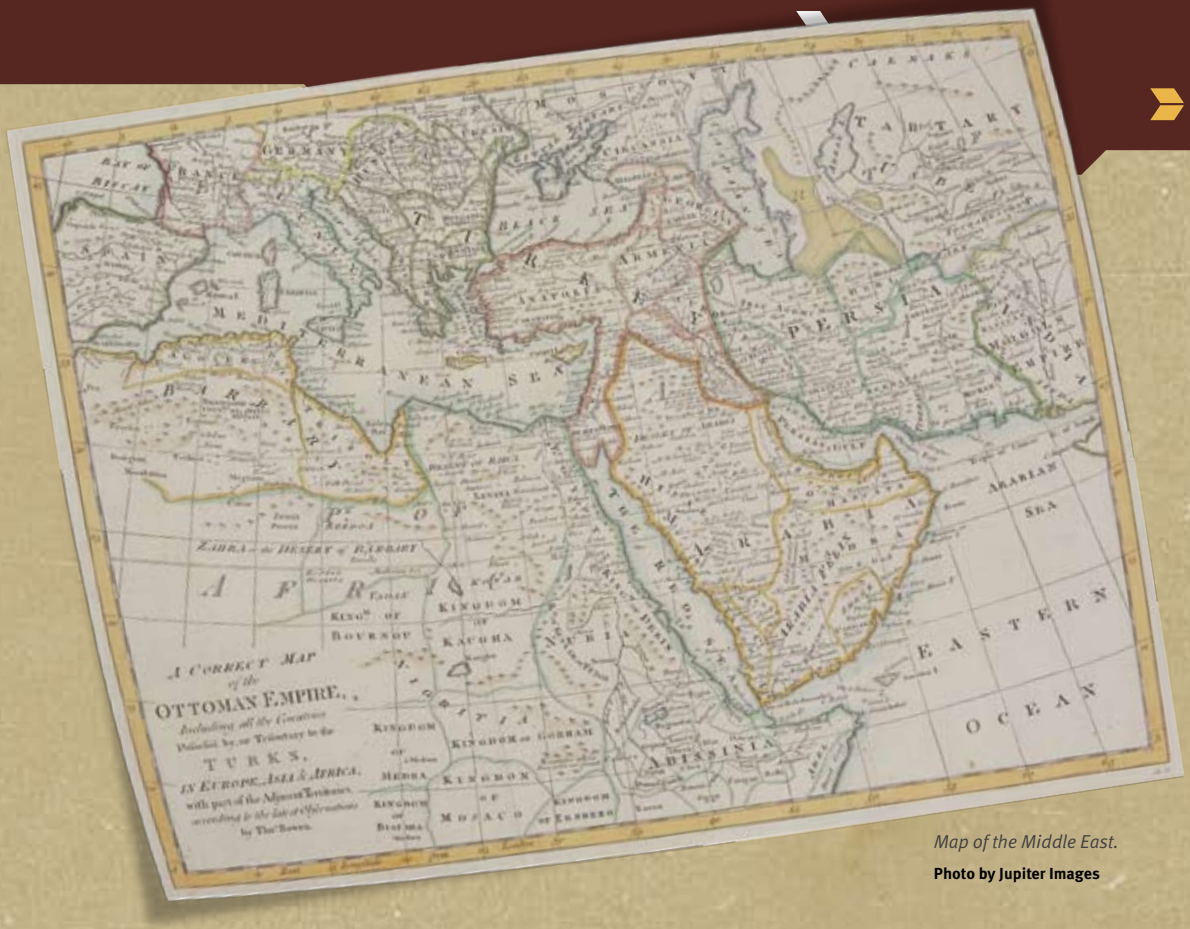
By Dr. Gary E. Weir

Once in a great while, history demonstrates that the human experience can make even fiction's greatest adventures seem dull. In 1913, Oxford graduate T.E. Lawrence wrote home to his mother while on board an Egyptian steamer between Beirut and Jaffa. He had just agreed to add his regional expertise to an expedition for the British Museum intent on surveying the area between Gaza and Petra. Beginning in 1909, Lawrence had walked literally hundreds of miles over many months seeking out first hand the Near East that fascinated him, going well beyond his extensive reading and Oxford education and all the while practicing languages and dialects. These walks took him to the region then known as Palestine, Syria, modern-day Lebanon, and north into Ottoman Turkey. His exploits during World War I, enhanced by popular journalists like the American Lowell Thomas, would soon turn this rather short and unimposing scholar into the international hero Lawrence of Arabia. However, on board that steamer in 1913 he commented, "We are obviously only meant as red herrings, to give an archaeological colour to a political job." In his letter, he openly shared with his mother a sense that this latest expedition went beyond simply gathering data to support biblical studies. He already displayed the instincts of a regional intelligence analyst, with a sense for the link between culture and success in conflict. In this case his instinct served him well, for the Bible had little to do with the actual problem that lay before them.

The British Director of Military Operations had discovered a dangerous strategic gap in local geographical knowledge. Having established a protectorate in Egypt in 1882, the British soon surveyed the Egyptian side of the Sinai frontier and quickly discovered a substantial cartographic void between this effort and the old survey of Palestine done by the young Lord Kitchener in 1872, when he and his fellow lieutenants in the Royal Engineers began their careers in the Queen's service. Working under academic cover for the British army, Lawrence and the expedition extensively surveyed over 400 square miles to bridge the gap in current knowledge.

With the advent of the Great War soon thereafter, Lawrence found work as a highly valued, resident regional expert who had literally experienced his account on foot. Very much like NGA Support Teams (NSTs), British intelligence in the eastern Mediterranean and Turkey in those years consisted of a forward network of experts, many of them university-affiliated, serving the local commands and linked by the controllers who directed their work. These men and women knew one another well, coming from the same social class, the same universities, and the same regional interests. They possessed a local knowledge of geography, language, culture,

Photo by Getty Images



Map of the Middle East.
Photo by Jupiter Images

religion and tribal politics that the leadership of the British army lacked, and they worked in groups, as Lawrence did with mentors like British archaeologists Sir Leonard Woolley and D.G. Hogarth. Indeed, Lawrence never had any formal military training, but with Hogarth's intercession, he received a commission as a second lieutenant interpreter in the British army with rank from Oct. 23, 1914.

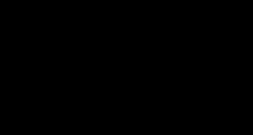
In his efforts both to help the army undermine the Turks' alliance with Germany in the Near East and to support the Arab revolt against the Ottoman Empire, Lawrence witnessed the British army failing to use the very resources that NGA's regional analysts, forward-deployed NSTs and allies bring to current efforts in the same region. After a 1916 trip to support the British head of military intelligence in Iraq, Lawrence severely criticized that command for not understanding the region and culture that shaped the people from whom they sought information. Unlike 21st century coalition forces who benefit from regionally based analysis from NGA and allies, Lawrence complained in one Army report, "They do all their examination of agents, prisoners, and refugees, through interpreters. They have never learnt or read anything of the manners of the Turk or Arab, or of their customs. They know nothing of the country beyond them ...." He emphasized the importance of the Arab Bureau, which his mentor Hogarth came to Cairo to lead as a newly minted lieutenant commander in the Royal Navy. The Arab Bureau endeavored to raise cultural appreciation of the region to the status of a strategic tool. One had to understand the people of Turkey and Arabia in their own context. Lawrence appreciated that, both as a lover of Arab culture and as a student of history while at Oxford University.

As a forward-deployed regional analyst, Lawrence helped conceive the strategy that led the Arab revolt to attack and seize the port of Al 'Aqabah from the nearly impossible desert side. He took part in both the dangerous desert crossing that made the victory possible and the final assault on the port as the only British officer involved in the attack. He brought with him all of his tools of persuasion: the white Arab costume he received as a gift and wore regularly, the language, an incomparable knowledge of the religion and culture and, if it became necessary, £20,000 in gold sovereigns in his camel's saddlebags. Al 'Aqabah soon became an essential port of supply for British Gen. Edmund Allenby's successful campaigns against the Turks. Practical experience and a cultural knowledge of the region, the essence of the regional analyst's tradecraft and the NST experience, helped turn the regional expert T.E. Lawrence into the legendary Lawrence of Arabia.

Dr. Gary E. Weir is the NGA Historian.

NGA 12 FOCUS AREAS

- Look outward, deploy forward, and be the most collaborative and integrated partner with the IC, the warfighter and other government agencies
- Invest in our people, with a commitment to diversity, to preserve our nation's GEOINT advantage
- Strengthen quality of analysis in concert with other IC partners
- Integrate airborne with other GEOINT sources
- Implement a secure and agile information enterprise to improve discovery and effective use of GEOINT
- Aggressively capture, integrate and manage all GEOINT sources in concert with our mission partners
- Advance basic and applied research and development of leading edge science and technology
- Align and balance collection capabilities with processing and exploitation to provide interoperable access to and discovery of NSG data and information
- Build new and enhance enduring international partnerships
- Provide a multi-INT environment at the New Campus East and NGA West that advances collaboration across the IC
- Maintain the highest standards of conduct
- Strengthen governance, functional management, and performance measurement



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